

REMARKS

By the present Amendment, Applicants have amended the title of the Specification as requested by the Examiner; have amended claims 1-5 and 7-17 to more appropriately define the invention; and have added new claims 18-20 to protect additional aspects of the invention. Applicants have also canceled claim 6, without prejudice or disclaimer of the subject matter thereof. This Amendment is fully supported by the originally filed application. For example, amendments to claims 1, 12, and 17 are supported by Figs. 1, 11, 12, and 13. Claims 1-5 and 7-20 are pending.

In the Office Action, the Examiner objected to the Specification because the title is not descriptive; rejected claims 6-8 under 35 U.S.C. § 112, second paragraph, as being indefinite; rejected claims 1-3, 6-11, 12, 13, and 16 under 35 U.S.C. § 102(b) as being anticipated by Aritome (U.S. Patent No. 5,949,101) (first § 102(b) rejection); and rejected claims 1-3, 6, 8-11, 12, 13, 16, and 17 under 35 U.S.C. § 102(b) as being anticipated by Aritome (second § 102(b) rejection). Claims 4, 5, 14, and 15 were objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form to include all of the limitations of the base claim and any intervening claims.

Applicants appreciate the indication of allowable subject matter. Applicants submit that the amendment to the title should overcome the objection to the Specification and that the amendments to claims 7-8 should overcome the rejection thereof under 35 U.S.C. § 112, second paragraph. The rejections of claim 6 under 35 U.S.C. §§ 112, second paragraph, and 102(b) are rendered moot in view of the cancellation thereof.

Applicants have also rewritten claims 4, 5, 14, and 15 in independent form to include all of the limitations of the base claim and any intervening claims. Therefore, these claims are allowable. Claims 7-11 and 16 have been amended to depend from claims 4 and 14, respectively. Therefore, claims 7-11 and 16 also contain allowable subject matter and the rejections thereof under 35 U.S.C. § 102(b) have been rendered moot. Further, new claims 18 and 19 depend from claims 4 and 14, respectively, and are also allowable at least because of their dependence from allowable base claims.

Applicants respectfully traverse the rejections of claims 1-3, 12-13, and 17 under 35 U.S.C. § 102(b) as being anticipated by Aritome.

In order to properly anticipate Applicants' claimed invention under 35 U.S.C. §102, each and every element of the claim in issue must be found, "either expressly or inherently described, in a single prior art reference." "The identical invention must be shown in as complete detail as is contained in the . . . claim. *Richardson v. Suzuki Motor Co.*, 868 F.2d 1226, 1236, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989)." See M.P.E.P. § 2131, 8th ed., 2001.

Claim 1 recites, *inter alia*, "a plurality of first trenches . . . ; a plurality of isolating fillers filled in said first trenches; [and] a plurality of second trenches formed in said isolating fillers, . . . a maximum width of said second trenches being smaller than a width of said first trenches." Aritome fails to teach each and every element of claim 1.

Aritome discloses a semiconductor memory device adapted to a high degree of integration and reliability. Col. 3, lines 2-7. Referring to Fig. 6A of Aritome, "element separating trenches . . . are formed on an n-type silicon substrate 1A and an insulating

film 2 is buried in each trench. . . . Then, a second gate electrode 6 . . . is formed to fill the trench with a third gate insulation film 33 disposed thereunder.” Col. 7, lines 26-39.

In the first § 102(b) rejection, the Examiner apparently considered the “element separating trenches” of Aritome as corresponding to Applicants’ claimed first trenches. Office Action, page 3. Because Aritome teaches that, “as shown in FIG. 9C, an SiO₂ film [2] is deposited . . . to fill the trench” (Aritome, col. 9, lines 8-10), the Examiner may at best argue that Aritome’s SiO₂ film 2 corresponds to Applicants’ claimed “plurality of isolating fillers,” which are “filled in said first trenches.” However, Applicants note that Aritome’s insulation film 2 (or oxide film 2) does not have “a plurality of second trenches” formed therein. Aritome only teaches that “the oxide film 2 is etched back by RIE until the polycrystalline silicon film 4 . . . [is] exposed.” Aritome, col. 9, lines 10-13.

In the second § 102(b) rejection, the Examiner apparently considered the trench in which SiO₂ film 12 is filled as corresponding to Applicants’ claimed first trenches. Office Action, page 5. See also Aritome, FIG. 12G. Also because “SiO₂ film 12 [is] filled in a trench” (Aritome, col. 10, lines 14-15), the Examiner may at best argue that Aritome’s SiO₂ film 2 corresponds to Applicants’ claimed “plurality of isolating fillers,” which are “filled in said first trenches.” However, Applicants note that Aritome’s SiO₂ film 12 does not have “a plurality of second trenches” formed therein. Aritome only teaches that SiO₂ film 12 is etched back by RIE and the “etching back [of] the film is so controlled as to be stopped at the lateral walls of the polycrystalline silicon film 4 as shown in FIG. 12C.” Aritome, col. 10, lines 14-19.

Therefore, Aritome clearly fails to teach at least “a plurality of second trenches formed in said isolating fillers,” wherein the “plurality of isolating fillers [are] filled in said first trenches,” as recited in claim 1.

In addition, the Examiner seemed to consider the regions of the device of FIG. 6A of Aritome in which second gate electrode 6 is formed (the first § 102(b) rejection) or the regions of the device of FIG. 12G of Aritome in which polycrystalline silicon film 75 is formed (the second § 102(b) rejection) as corresponding to Applicants' claimed second trenches. Applicants respectfully disagree because such regions are not trenches formed in “a plurality of isolating fillers filled in said first trenches,” as required by claim 1.

Even assuming, *arguendo*, that the regions of the device of Fig. 6A of Aritome in which second gate electrode 6 is formed or the regions of the device of Fig. 12G of Aritome in which polycrystalline silicon film 75 is formed correspond to Applicants' claimed second trenches, which Applicants do not concede, Applicants submit that such regions do not have “a maximum width . . . being smaller than a width of” the element separating trenches, allegedly corresponding to Applicants' claimed first trenches. See Aritome, FIG. 6A and FIG. 12G.

Therefore, Aritome fails to teach at least “a plurality of second trenches formed in said isolating fillers, . . . a maximum width of said second trenches being smaller than a width of said first trenches,” wherein the “plurality of isolating fillers [are] filled in said first trenches,” as recited in claim 1. Claim 1 is allowable over Aritome.

Claims 2-3 depend from claim 1 and therefore are also allowable at least because of their dependency from an allowable base claim.

In addition, claim 12 recites, *inter alia*, “making element isolating regions by forming a plurality of first trenches in a semiconductor substrate, . . . filling said plurality of first trenches with a plurality of isolating fillers; . . . [and] making a plurality of second trenches in said isolating fillers filled in said first trenches, . . . a maximum width of said second trenches being smaller than a width of said first trenches.”

For reasons similar to those set forth above regarding the rejection of claim 1, Aritome fails to teach at least “making a plurality of second trenches formed in said isolating fillers filled in said first trenches, . . . a maximum width of said second trenches being smaller than a width of said first trenches.” Therefore, claim 12 and its dependent claim 13 are allowable over Aritome.

Finally, claim 17 recites a method for manufacturing a semiconductor memory that includes, *inter alia*, “making a plurality of first trenches . . . making element isolating regions by filling isolating fillers in said first trenches; . . . making a plurality of second trenches in said isolating fillers filled in said first trenches . . . , a maximum width of said second trenches being smaller than a width of said first trenches.”

As discussed above, Aritome fails to teach at least “making a plurality of second trenches in said isolating fillers filled in said first trenches . . . , a maximum width of said second trenches being smaller than a width of said first trenches.” Therefore, claim 17 and its dependent claim 20 are allowable over Aritome.

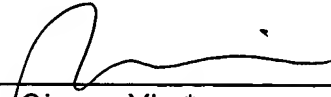
In view of the foregoing amendments remarks, Applicant respectfully requests reconsideration and reexamination of this application and the timely allowance of pending claims 1-5 and 7-20.

Please grant any extensions of time required to enter this response and charge any additional required fees to our deposit account 06-0916.

Respectfully submitted,

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Dated: September 15, 2004

By: 
/Qingyu Yin *

* With limited recognition under 37 C.F.R. § 10.9(b).